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Mikrowellenunterstützte Synthese organischer Substanzen

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Abstract:

The following diploma thesis deals with the question how a reaction will behave, if you use a microwave-tool or a heating-reactor instead of normal synthesising. That means that I try to find out, how the spoil of a reaction alters, when I use microwaves (the heat flows from inside to outside) or when I heat constantly and in equal measure with a metal coating from outside to inside. So, we don't heat the reaction punctual from outside to inside. I also use different solvents. Because of a lack of time I only synthesized acetylsalicylic acid.

At first, I synthesised the acetylsalicylic acid in a normal way to get a reference value. Then I synthesized the compound in the microwave-tool and in the heating-reactor under different conditions (solvent, temperature and time) many times to get a suiting reaction variation. After the reactions had been finished, they got processed.

To get the mass of acetylsalicylic acid from the different preparations, I measured them against a calibration row with acetylsalicylic acid and salicylic acid on the HPLC. The preparations, which were worked out with the solvent Toluol, didn't get measured on the HPLC. These products were measured with the NMR, IR and the TLC.

All results were compared and evaluated. It turned out that I didn't get the favoured result. With water as solvent there are only a few amounts of acetylsalicylic acid in the product. With higher temperatures the amount of the product decreases. It is also a fact that there is a better yield in the microwave when there is more time provided. That is contrary to the heating-reactor. The products with no solvent get more acetylsalicylic acid. With the microwave-tool there is a better spoil within less time. I can't draw a clear conclusion with the heating reactor, because the amount of products doesn't depend on the reaction time.

